

## CLAIMS

1. A gas detector device comprising a wavelength modulated laser source (2; 34, 36) and a light sensor (94, 96) respectively arranged at the periphery of a detection region (48) intended for receiving at least a first gas the concentration or presence of which is to be determined, said source providing an initial light signal  $S_0$   
5 which is wavelength modulated at a first frequency  $F$  around an absorption line of said first gas, said sensor receiving a resulting light signal ( $S_G$ ) formed by the initial light signal having passed through said detection region, characterized in that the light sensor is of the type providing a detection signal substantially proportional to the time derivate of said resulting light signal thus forming an electronic signal which is  
10 substantially proportional to the time derivate of said resulting light signal, said device further comprising first means (80) for generating a first modulation reference signal (20) at said first frequency and second means (82) for generating a second modulation reference signal (24) at twice said first frequency, said electronic signal being multiplied by said first modulation reference signal and then integrated over time  
15 in order to provide a first measuring signal ( $S_{MF}$ ) which is a function of the intensity of said initial light signal and substantially independent of the concentration of said first gas, said electronic signal being also multiplied by said second modulation reference signal and then integrated over time in order to provide a second measuring signal ( $S_{M2F}$ ) which is a function of the first gas absorption and substantially independent of  
20 an intensity modulation of said initial light signal at said first frequency.
2. A gas detector device comprising a wavelength modulated laser source (2; 34, 36) and a light sensor (54, 56) respectively arranged at the periphery of a detection region (48) intended for receiving at least a first gas the concentration or presence of which is to be determined, said source providing an initial light signal ( $S_0$ )  
25 which is wavelength modulated at a first frequency ( $F$ ) around an absorption line of said first gas, said light sensor receiving a resulting light signal ( $S_G$ ) formed by the initial light signal having passed through said detection region, characterized in that the light sensor is of the type providing a detection signal proportional to said resulting light signal, the device further comprising an electronic time derivator (64) to which the detection signal is provided, this electronic time derivator provided an electronic signal  
30 which is substantially proportional to the time derivate of said resulting light signal, said device further comprising first means (80) for generating a first modulation reference signal (20) at said first frequency and second means (82) for generating a second modulation reference signal (24) at twice said first frequency, said electronic  
35 signal being multiplied by said first modulation reference signal and then integrated over time in order to provide a first measuring signal ( $S_{MF}$ ) which is a function of the

- intensity of said initial light signal and substantially independent of the concentration of said first gas, said electronic signal being also multiplied by said second modulation reference signal and then integrated over time in order to provide a second measuring signal ( $S_{M2F}$ ) which is a function of the first gas absorption and substantially independent of an intensity modulation of said initial light signal at said first frequency.
- 5     3.     Device according to claim 1 or 2, characterized in that it further comprises processing means (90) receiving said first and second measuring signals and providing an information relative to the concentration of the first gas.
- 10    4.     Device according to claim 1, characterized in that said light sensor is formed by a pyroelectric sensor.     ?
5.     Device according to claim 1, characterized in that said light sensor is formed by at least one photodiode or one thermo-element or one bolometer.
6.     Device according to any of the preceding claims, characterized in that said source is a vertical cavity surface emitting Laser (VCSEL).
- 15    7.     Device according to any of claims 1 to 5, characterized in that said source is a distributed feedback laser (DFBL).
- 20    8.     Device according to any of the preceding claims, characterized in that said laser source and said light sensor are both located at a same side of the detection region, a reflective structure being arranged at the other side of this detection region.
9.     Device according to claim 8, characterized in that said laser source and said light sensor are both integrated in/on a common substrate.
10.    Device according to any of the preceding claims, characterized in that it comprises at least two laser sources for detecting at least two different gases and a single light sensor on which both generated laser beams are alternatively directed in order to provide an information relative to each of both gases.